on the south-western coast of Persia, where the thermometer has been known not to fall lower than 100°, night or day, for forty consecutive days during July and August, and often to reach 128° in the afternoon. Among the highest shade temperatures we may mention one at night during the Italian occupation of Massowah, when the thermometer is said to have recorded 122°. Temperatures above 120° are occasionally met with in India; 121°·5 was recorded at Dera-Ishmail-Khan (lat. 32° N.) in 1882, and 126°·0 at Bhag (lat. 29° N.) in 1859. At Wilcannia on the Darling River, New South Wales, shade temperatures varying from 107° to 129° were recorded on each day from January 1 to 24 in 1896. Among the low temperatures (in addition to the extremes mentioned above) we may quote −63°·1 at Poplar River, North America, in January 1885. During the intense frost in Scotland on December 4, 1879, −16° was reported from Kelso and −23° from Blackadder, in Berwickshire. The extremes in or near London for 104 years were 97°·1 in July 1881, and 4° in December 1796 and January 1841.

THE *Journal of the Royal Microscopical Society* for October contains a short paper (with plate) by Mr. James Yate Johnson on some sponges belonging to the Clionidæ obtained at Madeira, in which three new genera are established, named *Acca*, *Nisella* and *Scantilla*. In the section on microscopy is a description of an old compass microscope taken from a German work on the microscope by Martin Frobenius Ledermüller (1763), called Russwurm's "Universal Microscope," which appears to have been a combination of compass and tube microscope in an unusual number of forms; also a description of "Adams' Compendious Pocket Microscope" (1771), which more nearly conforms to the microscopes of the present day than any of those which preceded it. In the section on technique several new pigments are described, also two new methods for orienting small objects.

*Bollettino della Società Sismologica Italiana*, vol. v., Nos. 2, 3, 1899–1900.—Vertical component microseismograph, description and results, by G. Vicentini and G. Pacher. A reprint of a paper already noticed in NATURE.—Supplementary considerations with regard to the Umbria-Marches earthquake of December 18, 1897, by A. Issel.—The earthquake in the Parma-Reggio district of the Appennines during the night of March 4–5, 1898, by C. Agamennone. The shock was felt over an acre of about 70,000 sq. km., and was also recorded by horizontal pendulums at Strassburg and Shide; the velocity of the earth-waves will be considered in another paper.—The Hereford earthquake of December 17, 1896, by C. Davison. A summary (in English) of the writer's report on this earthquake.—Notices of the earthquakes recorded in Italy, February 5 to April 23, 1898; the most important being those of Asia Minor on February 5, Cividade (Udine) on February 20 and April 12, Reggio and Parma on March 4, Ferrara on March 9, and distant earthquakes on February 18 and April 15 and 23.

## SOCIETIES AND ACADEMIES.

**Physical Society**, October 27.—Prof. W. E. Ayrton, F.R.S., Vice-President, in the chair.—Dr. S. W. Richardson read a paper on the magnetic properties of the alloys of iron and aluminium. Observations were made upon four alloys containing respectively 3·64, 5·44, 9·89 and 18·47 per cent. of aluminium. The alloys were used in the form of anchor rings, and were wound with primary and secondary coils separated by asbestos paper. The temperatures used ranged from −83° C. to 900° C. The low temperatures were produced by the rapid evaporation of ether surrounded either by ice and salt or by carbon dioxide snow. The high temperatures were obtained either electrically or by gas muffles. In both cases the actual temperatures were deduced from the resistance of the secondary, which was made of platinum wire and wound next the metal. The author employed Maxwell's null method of measuring mutual induction, increasing the sensitiveness by the introduction of a secohmmeter making about three revolutions per second. In order to test the accuracy of the method some of the experiments were repeated with a ballistic galvanometer in the ordinary way, and the agreement obtained between the results in the two cases was well within the limits of experimental error. The chief conclusions to be drawn from the experiments may be summed up as follows: (1) The alloys behave magnetically as though they consisted of two distinct media superposed. (2) The general roundness of the curves and their lack of abruptness near the critical point seems to indicate that the alloys are heterogeneous in structure. (3) The permeability decreases with rise of temperature near the critical point until a minimum value is reached, when further rise of temperature produces very slight diminution, if any, in the permeability. (4) The experiments suggest that the maximum value of the permeability for an alloy containing 10 per cent. of aluminium is reached at about −90° C. (5) An alloy containing 18·47 per cent. of aluminium has a critical point at about 25° C., and gives no indication of temperature hysteresis. This alloy probably has a maximum permeability much below −90° C. The author has found that at high temperatures there is a second maximum on the induction curve. This maximum becomes less and less noticeable as the field is increased.—The Secretary read a note from Prof. Barrett on the electric and magnetic properties of aluminium and other steels. The first part of the note dealt with the electrical conductivity of various alloys, and discussed the effect of composition and annealing upon the value of the conductivity. The second part of the note referred to magnetic effects. The most remarkable effect produced by aluminium on iron is the reduction of the hysteresis loss. The permeability of nickel steels is shown to be very much influenced by annealing. It is found that the addition of a small quantity of tungsten to iron hardly affects the maximum induction, yet increases the retentivity and coercive force. The experiments show that the best steel for making permanent magnets is one containing 7½ per cent. of tungsten. The magnetometric method was employed throughout. Prof. S. P. Thompson drew attention to the wide range of temperature over which the author had conducted his experiments, and also to the small number of alloys used. He said a very much finer connection between the properties could be obtained from the examination of more alloys, and expressed his interest in the existence of the second maximum on the induction curve. He would like to know how the percentage composition of the alloys had been determined. Turning to Prof. Barrett's note, Prof. Thompson referred to the difference in the breadths of the hysteresis curves for aluminium and chromium alloys. Mr. Appleyard asked for information upon the permanence of the curves. Dr. Richardson, in replying, said the compositions were determined by analyses made after the experiments had been performed. It was proposed to carry on the research upon a series of aluminium alloys which he had obtained. The Chairman expressed his special interest in the agreement which the author had obtained between the ballistic method and the null method of Maxwell increased in sensitiveness by the secohmmeter.—Mr. Addenbrooke exhibited a model illustrating a number of the actions in the flow of an electric current. The model consisted of a spiral of steel wire in the form of a closed circuit. Inside the spiral was placed a wire which was supposed to be carrying the current, and which directed the motion of the spiral. A rotational movement given to one part of the spiral was transmitted by the wire, and produced a rotational movement at another part of the spiral. The resiliency of the spring represents capacity, and the torque electromotive force. Self-induction can be represented by weighting the spring. Prof. Everett expressed his interest in the way that the correspondence between the propagation and rotation agreed with that between the direction of a current and the direction of the magnetic force. Prof. S. P. Thompson agreed that many analogies could be worked out by the model, but gave one or two examples to show that erroneous conclusions might be drawn by pushing the analogy too far.—Mr. W. Watson repeated some experiments with the Wehnelt interrupter devised by Prof. Lecher. The experiments showed in a clear and striking manner the fact that subsequent sparks tend to pass through the portion of air heated by the first one. In the first experiments motion of the heated air was caused by differences in density, and in the later experiments by allowing the sparks to take place in a strong electromagnetic field. The continuous rotation of the spark in a given field proved the unidirectional nature of the discharge. In reply to Mr. Blakesley, Mr. Watson said he used the word "ionised" in his explanations to express simply the fact that the air had been rendered a conductor by the passage of the spark. The Chairman referred to one of the first experiments performed. In this experiment the electrodes consisted of two copper wires in a vertical plane, slightly inclined to one another and nearest together at their lowest points. On switching on the current

the spark passed between the lowest points; but as the ionised air ascended so did the most conducting path, and consequently the spark worked its way to the top of the electrodes. Here the heated air passed away and the spark returned to the lowest point to rise again. The Chairman thought that these effects might be due to the magnetic forces produced by the circuit itself. That similar effects in the arc light were due to this cause had been proved many years ago. Mr. Watson repeated some of the experiments under new conditions, and proved that the explanation of the phenomena was not to be found in the tendency of the circuit to enlarge itself owing to magnetic forces. Mr. Boys pointed out that the relation of the heating effect to the current, which was small in the arc light, was very large in the case of the spark discharges used, and therefore the movement of the spark in the latter case was practically determined by the heating effect in consequence of the relatively small importance of the electromagnetic effect. Prof. S. P. Thompson remarked that similar effects could be produced by an alternating current working an ordinary induction coil. —The Society then adjourned until November 10, when the meeting will be held in the Central Technical Institute.

PARIS.

**Academy of Sciences**, October 23.—M. van Tieghem in the chair.—On the simultaneous occurrence of phenomena of oxidation and hydration at the expense of organic substances under the influence of free oxygen and light, by M. Berthelot. Experiments were carried out on the slow oxidation of ether in presence of water and air, or of hydrogen peroxide. Practically no oxidation of moist ether takes place in the dark, either with air or hydrogen peroxide. After five months' exposure to light in a sealed tube, the air remaining over the ether contained no trace of free oxygen, but some aldehyde, acetic acid, and alcohol were found in the ether. A little methane is formed at the same time. Two chemical reactions are thus shown to go on together, a hydration and an oxidation. The author considers that similar reactions go on in nature, such substances as the sugars and carbohydrates, glycerides, &c., undergoing simultaneous hydration and oxidation.—Equilibrium of a vessel carrying liquid, by M. Appell. The author has shown in a previous paper on the same subject that the determination of the positions of equilibrium of a vessel with a liquid cargo may be reduced to the determination of the smallest value of the distance between two parallel planes tangential to two given surfaces. The problem is now simplified to finding the shortest distance of a fixed point to a tangent plane to one surface.—Observations on a note by M. Blondel, relating to the reaction of induction in alternators, by M. A. Potier.—On certain remarkable surfaces of the fourth order, by M. G. Humbert.—On the determination of the coefficient of solubility of liquids, by MM. A. Aignan and E. Dugas. In a previous paper by the authors it is shown how to determine the coefficients of reciprocal solubility of two non-miscible liquids when no contraction takes place. In the present paper, expressions are developed in which this restriction is removed, and the results are applied to experiments on mixtures of aniline and water, and amyl alcohol and water.—On merogonic impregnation and its results, by M. Yves Delage. The results published by the author a year ago showing the possibility of producing an embryo from a portion of an egg not containing a nucleus have now been extended. The fertilisation of non-nucleated ovular cytoplasm is not limited to the echinoderms. It is found in some molluscs, and in the annelid *Lanice conchylega*. Since it can no longer be looked upon as a biological curiosity, but is a process which may be generalised, the author proposes to give it the name of merogony.—The affinities and the property of absorption or arrest of vascular endothelium, by M. Henri Stassano. It is shown that it is the affinity of the vascular endothelium for mercury which is the cause of the predominance of this poison in the organs containing the most blood. This endothelium also appears to act in the same way with other poisons, such as strychnine and curare.—Death by the electric discharge, by MM. J. L. Prevost and F. Battelli. From a series of experiments on dogs, rabbits and guinea-pigs, the authors conclude that the fatal effects of the electric shock are proportional to the energy of the discharge, and are not proportional to the quantity of electricity passing.—The grafting of some monocotyledons upon themselves, by M. Lucien Daniel. After many unsuccessful attempts, it has been found possible to graft a part of a monocotyledon (Vanilla and *Philodendron*) upon itself. The success depends largely upon the extent of the surfaces in contact.—*La graisse*, a bacterial disease of the haricot, by M. Delacroix. The disease is probably identical with that recently described by M. E. F. Smith as affecting the haricot in the United States, and the bacillus from which is named *Bacillus phaseoli*. No curative treatment of the living plant would appear to be possible.—Observations relating to the deposit of certain calcareous travertins, by M. Stanislaus Meunier.

## DIARY OF SOCIETIES.

*THURSDAY*, NOVEMBER 2.

LINNEAN SOCIETY, at 8.—On the Proliferous State of the Awn of Nepal Barley: Rev. Prof. Henslow.—On the Hyobranchial Skeleton and Larynx of the New Aglossal Toad, *Hymenochirus Boettgeri*: Dr. W. G. Ridewood.—On the Eye-spot and Cilium in *Euglena viridis*: Harold Wager.

CHEMICAL SOCIETY, at 8.—The Theory of Saponification: J. Lewkowitsch. —The Action of Dilute Nitric Acid on Oleic and Elaidic Acids: F. G. Edmed.—Tetrazoline: Siegfried Ruhemann and H. E. Stapleton.—On Ethylic Dibromobutanetetracarboxylate and the Synthesis of Tetrahydrofurfuran-$\alpha\alpha'$-dicarboxylic Acid: Dr. Bevan Lean.—(1) Camphoroxime. Part III. Behaviour of Camphoroxime towards Potassium Hypobromite; (2) Optical Influence of an Unsaturated Linkage on certain Derivatives of Bornylamine: Dr. M. O. Forster.

CAMERA CLUB, at 8.15.—Scenery in the Canary Islands: T. C. Porter.

*TUESDAY*, NOVEMBER 7.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Address by the President, Sir Douglas Fox, and presentation of Prizes.

ANTHROPOLOGICAL INSTITUTE, at 8.30.—Notes on the Ethnology of Tribes met with during progress of the Juba Expedition of 1897-99: Lieut.-Colonel J. R. L. Macdonald, R.E.

*THURSDAY*, NOVEMBER 9.

MATHEMATICAL SOCIETY, at 8.—Certain Correspondences between Spaces of $n$ Dimensions: Dr. E. O. Lovett.—On the Form of Lines of Force near a Point of Equilibrium; The Reduction of Conics and Quadrics to their Principal Axes by the Weierstrassian Method of reducing Quadratic Forms; and on the Reduction of a Linear Substitution to a Canonical Form; with some Applications to Linear Differential Equations and Quadratic Forms: T. J. I. Bromwich.—On Ampère's Equation $Rr+2Ss+Tt+U(rt-S^2)=V$: Prof. A. C. Dixon.—The Abstract Group isomorphic with the Symmetric Group on $k$ Letters: Dr. L. E. Dickson.

*FRIDAY*, NOVEMBER 10.

ROYAL ASTRONOMICAL SOCIETY, at 8.

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